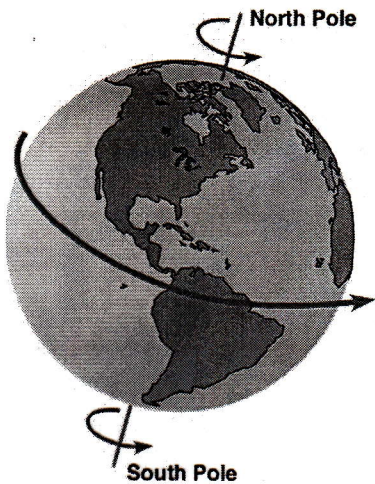


Earth Motions Note Outline - Astronomy



Motion: Rotation

- Turning or spinning of a body on its axis
- Earth's axis is tilted 23.5° from the ecliptic (plane of Earth's orbit around the Sun, and is the apparent path of the Sun throughout the year) {Earth's tilt varies from 21.5° - 24.5° , this is known as "obliquity" 41k yr. cycle}
- Rate of rotation is once per 24 hour period, but speed or rotation varies depending on location on Earth (speed = dist./time) Speed at the equator = 1035mi/hr!
- Results in diurnal motion (the daily rising and setting of things in the sky)
- Period of rotation can be measured in two ways:

-Solar Day: relative to the Sun, when the Sun returns to its original position in the sky (when a position on Earth realigns with the Sun – 24 hours)

-Sidereal Day: relative to distant stars, when a star other than the Sun returns to its original position in the night sky (when a position on Earth realigns with a star other than the Sun) – 23hr. 56min. 4sec.

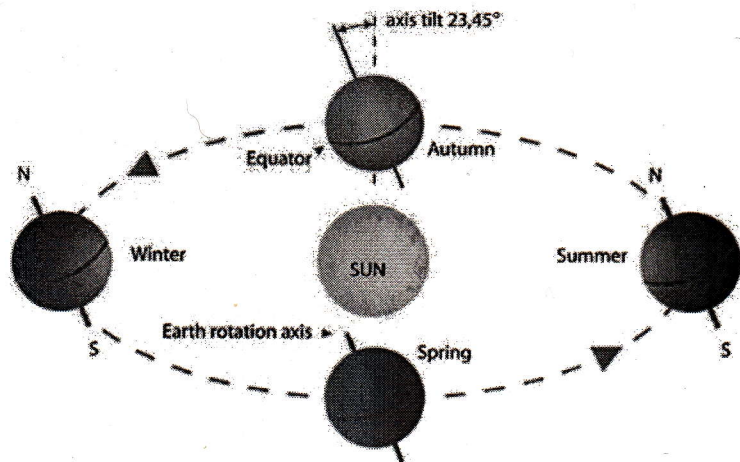
- Earthquakes can affect the rotation of Earth*

Motion: Revolution

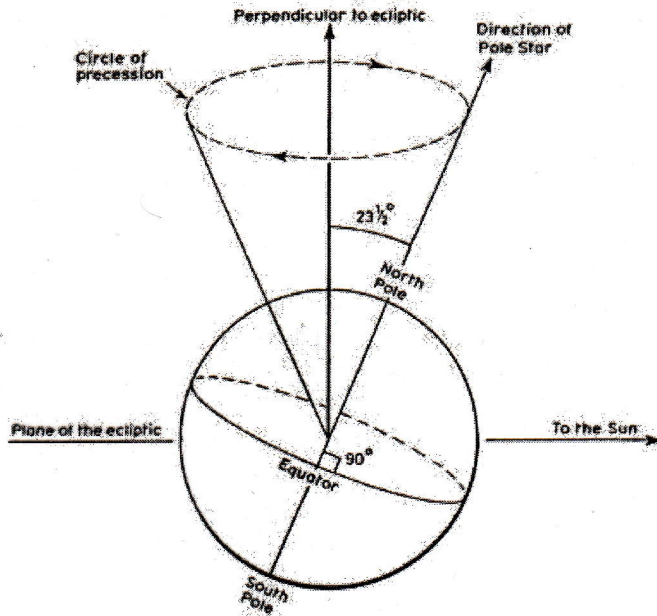
- The motion of a body along its orbit around some point in space
- Earth revolves around the Sun, once/yr., in an elliptical orbit at an avg. speed of 66,500 mi/hr. (875 yrs. @ 80mi/hr.!)
- Orbital shape varies – "eccentricity" changes from nearly circular to more elliptical over many hundreds of thousands of years.
- Distance from Sun varies throughout year:
 - Perihelion: Pt. at which E is closest to Sun (~Jan 3)
 - Aphelion: Pt at which E is furthest from Sun (~July 4)

*Distance from Sun does NOT cause seasons – Seasons are caused by the amount of energy a hemisphere receives in a given 24hr. period which varies b/c of E's tilted axis and revolution

- Revolution also results in the two hemispheres experiencing seasonal constellations.



Earth Motions Note Outline - Astronomy



Motion: Precession

- The “wobble” of the Earth’s axis, like a spinning top, over a 26,000yr. period.
- Axes point in different locations over time.
- Changes North/South Stars over time.
- This motion, along with changes in eccentricity and obliquity, affect long-term climate change and cause ice ages. (Milankovitch Cycles)

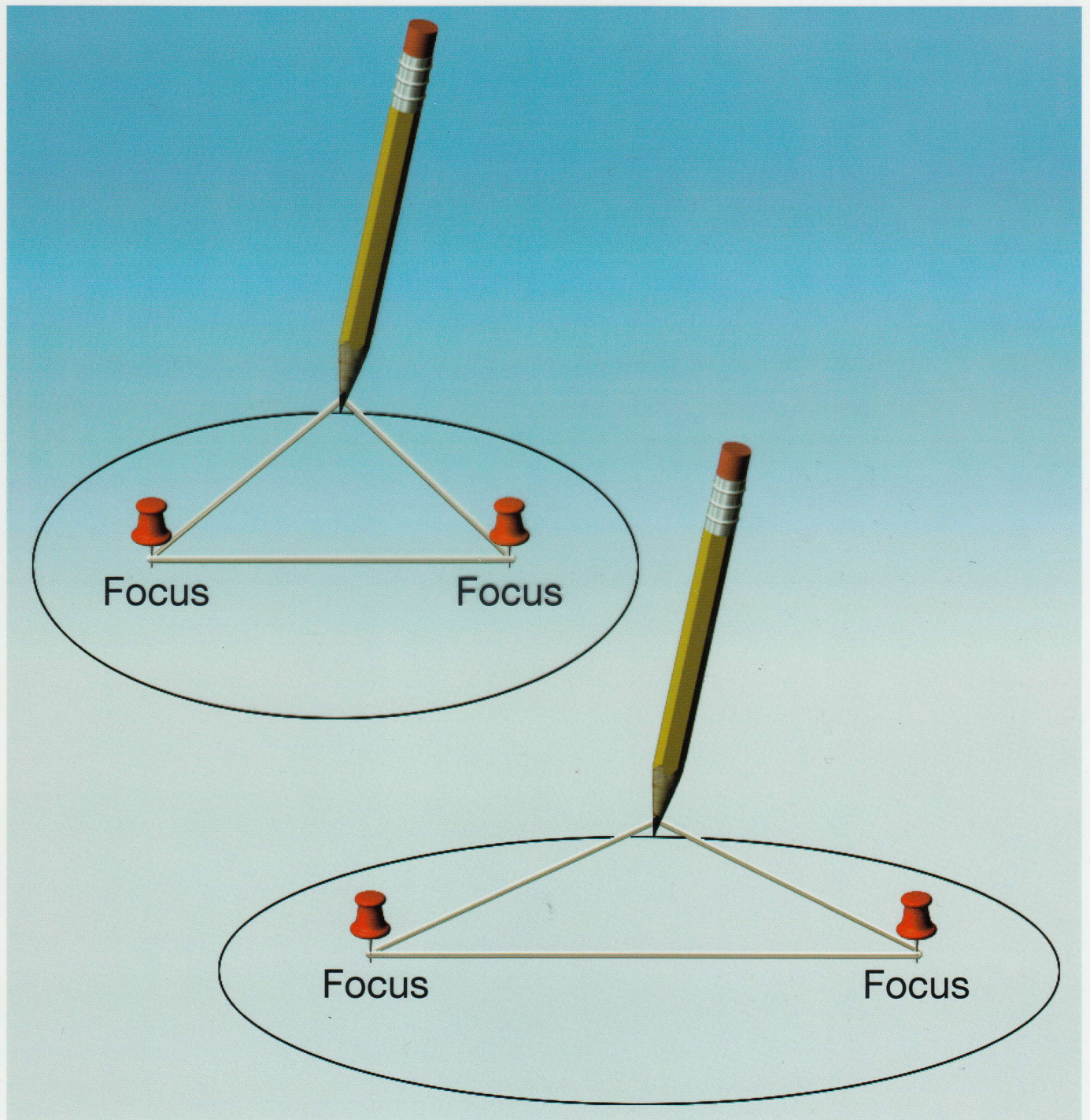
Other Motions: Interstellar & Intergalactic

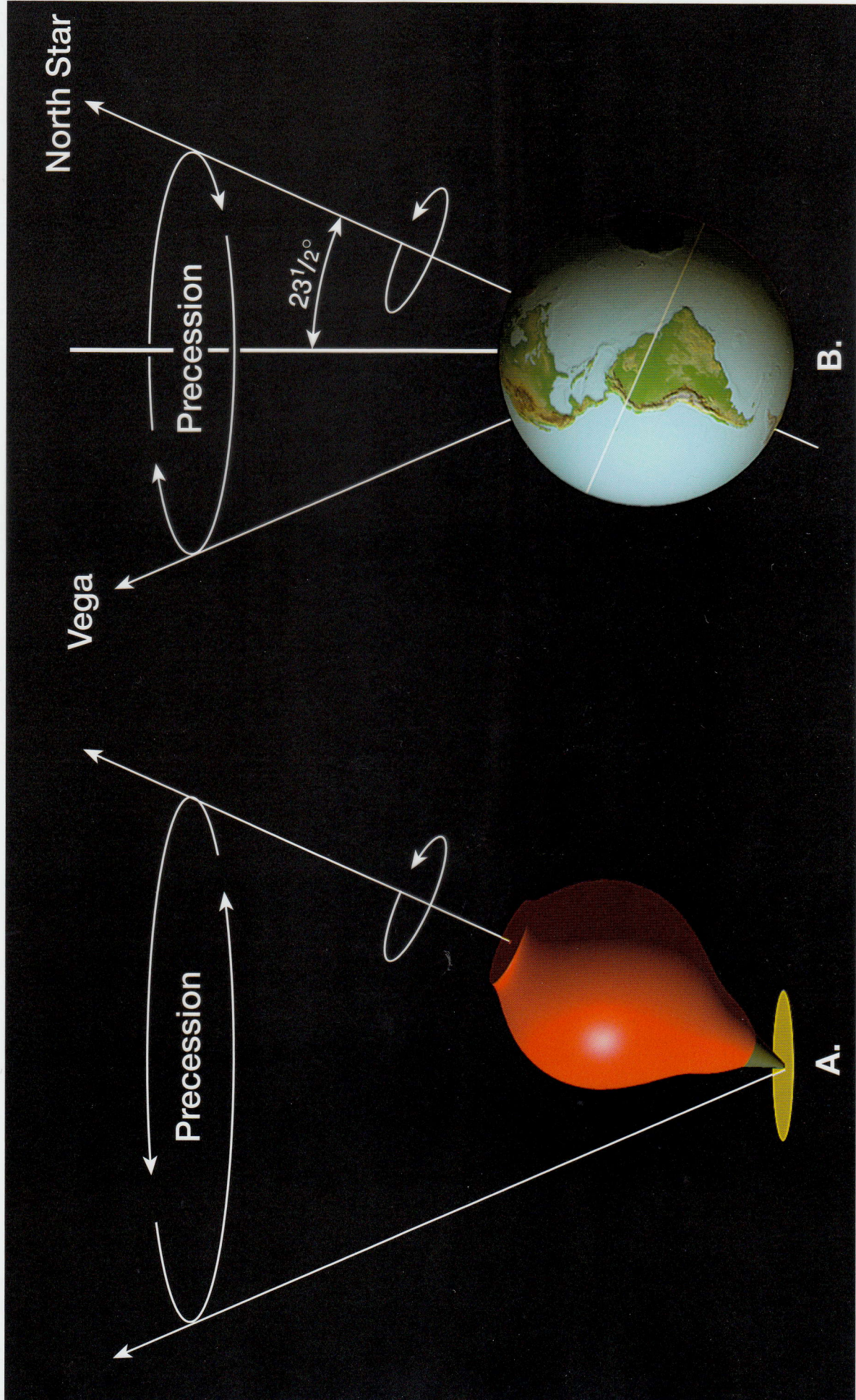
- Sun (along with entire solar system) is moving in the direction of Vega @ 12.5mi/s
- The Sun and other nearby stars are revolving around the center of the Milky Way Galaxy at 155mi/s (one revolution takes 230 million yrs.)
- Milky Way Galaxy is moving in the direction of the neighboring Andromeda Galaxy, and will one day collide! (see wikispace for simulation)



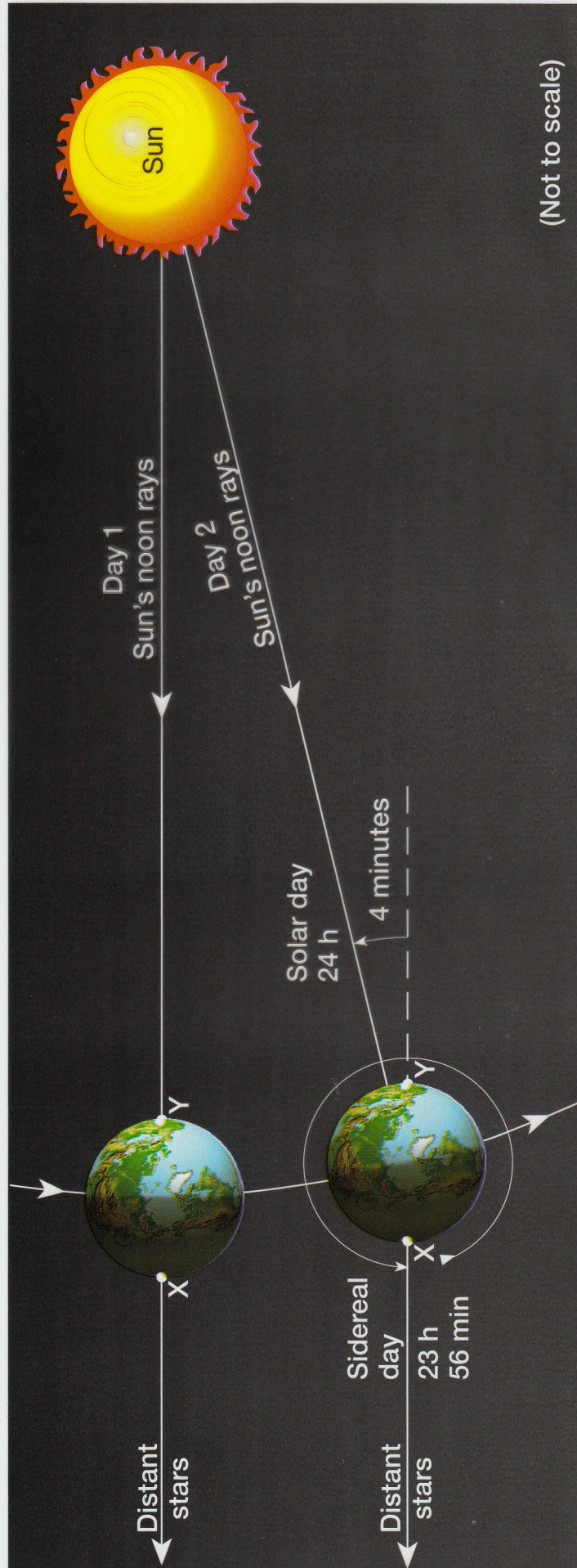
Vocab:

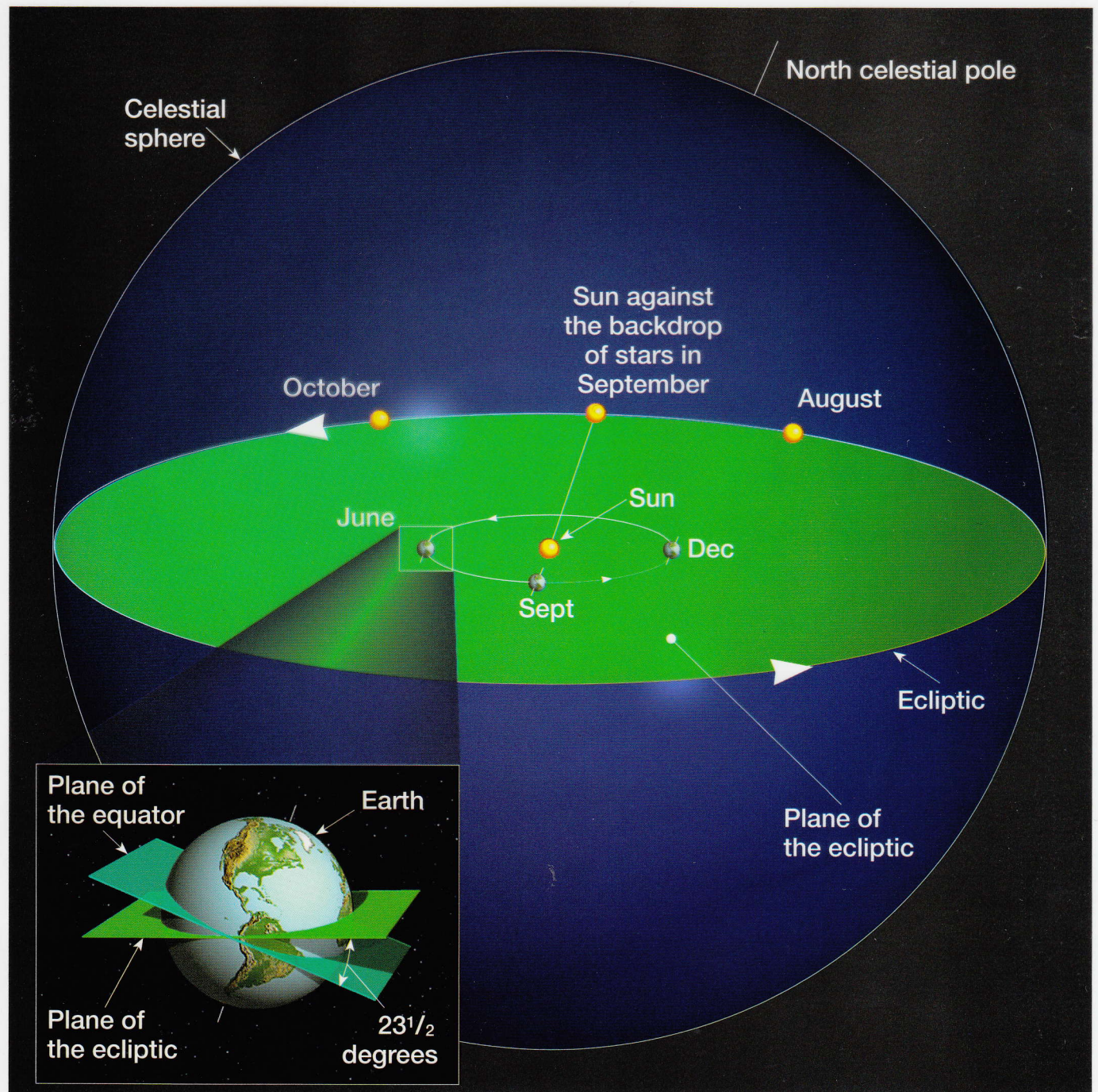
- Rotation
- Revolution
- Precession
- Solar Day
- Sidereal Day
- Ecliptic
- Aphelion
- Perihelion
- Vernal Equinox
- Autumnal Equinox
- Summer Solstice
- Winter Solstice





Solar day vs. sidereal day





Apparent position of the Sun

